

# Technology Opportunity

## Visualization Tool for Computer Simulations

The National Aeronautics and Space Administration (NASA) seeks to transfer a visualization tool for the next generation of computer simulations. The visualization tool, pV3-Gold, can be used during and after a computer simulation to extract and visualize the physical features contained within the results of computer simulations.

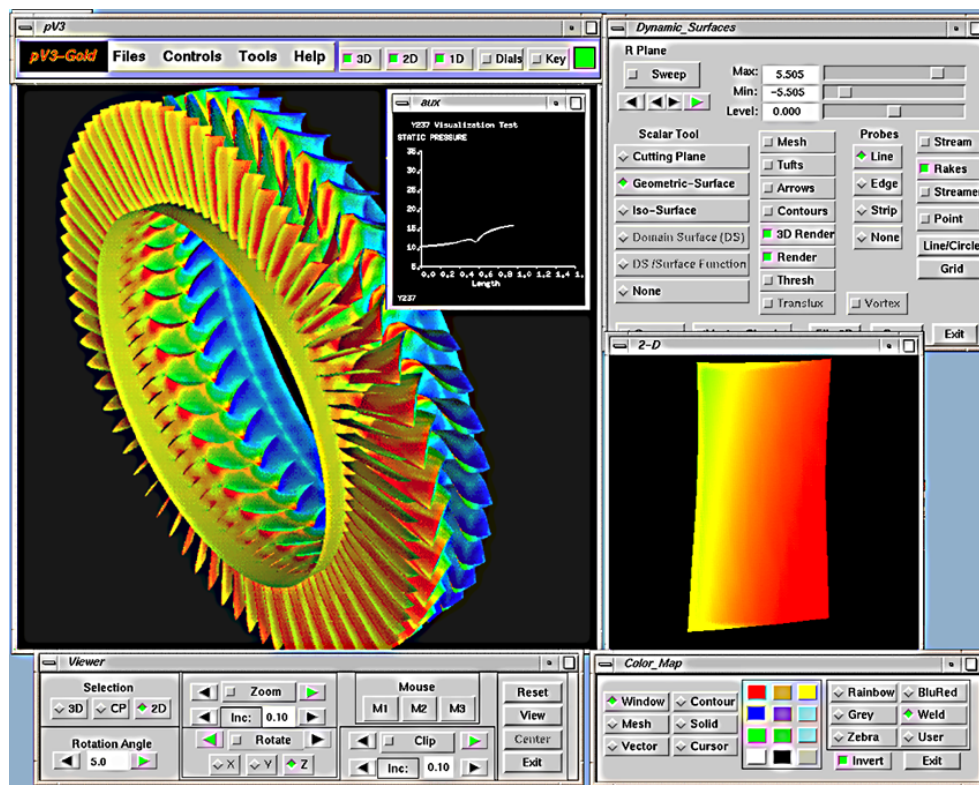
### Potential Commercial Uses

Visualize data of computer simulations in

- Computational fluid dynamics
- Structural analysis
- Thermodynamics
- Electromagnetics

### Benefits

- Handles steady-state as well as time-varying three-dimensional (3-D) data in both post-processing and co-processing modes
- Full support for structured and unstructured meshes
- Supports three types of transient data: unsteady, deformation, and structure unsteady
- High bandwidth through passing only the data that is required to be rendered
- Features scalar tools, vector tools, and probes
- Volumes may be broken up into any combination of shapes
  - Tetrahedral
  - Pyramid



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- Prism
- Hexahedral
- Polytetrahedral strips
- Structured blocks

## The Technology

The pV3-Gold, an extension of the Massachusetts Institute of Technology's pV3 visualization environment, is one of the tools being developed as part of the Affordable High Performance Computing Project. Work on the project is being done under a cooperative research agreement between NASA Lewis and a team of industry and university partners led by Pratt & Whitney United Technologies.

The pV3 visualization environment is designed for co-processing multidimensional visualizations of scalar, vector, and tensor data generated in a distributed computing network. It is designed to allow the numerical solver to run as independently as possible. If the numerical procedure takes days to reach a solution, pV3 can periodically connect to the simulation, allow viewing of the data as they change, and then disconnect. Programming is required to merge the visualization with the numerical solver. All that is required of the programmer is knowledge of the data. If the data are distributed in a cluster of machines, pV3 deals with this, so there are few complications for the user.

The original pV3 interface has been replaced with an intuitive Motif graphical interface where data may

be visualized in one-, two- and three-dimensional view windows. The pV3-Gold visualization environment maintains all the original functions of pV3. New functions incorporated into pV3-Gold include annotation, animation recording, and feature extraction.

## Options for Commercialization

One of the Affordable High Performance Computing project objectives is to commercialize the pV3-Gold visualization environment. Currently, the tool is available for beta testing. If your company is interested in beta-testing the pV3-Gold visualization environment, please contact us.

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## Key Words

Visualization  
Postprocessing  
Co-processing  
Computer simulation



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